



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,113	12/09/2003	Mitica Manu	MS306029.01/MSFTP2220US	5443
27195	7590	07/11/2008		
AMIN, TUROCY & CALVIN, LLP			EXAMINER	
24TH FLOOR, NATIONAL CITY CENTER			FITZPATRICK, ATIBA O	
1900 EAST NINTH STREET				
CLEVELAND, OH 44114			ART UNIT	PAPER NUMBER
			2624	
			NOTIFICATION DATE	DELIVERY MODE
			07/11/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

doctet1@thepatentattorneys.com

hholmes@thepatentattorneys.com

lpasterchek@thepatentattorneys.com

Office Action Summary

Application No.

10/730,113

Applicant(s)

MANU ET AL.

Examiner

ATIBA O. FITZPATRICK

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 04/22/2008 have been fully considered but they are not persuasive. On page 15 of applicant's response, applicant states that "Batten does not disclose or suggest each and every aspect set forth in the subject claims and indeed teaches away from Applicant's claims". The office disagrees with the assertion that every aspect set fourth in the originally filed claims 1, 2, 3, 4, 5, 13, 16, 17,18, 19, 20 and 28 were not disclosed or suggested by Batten. No mention is made of which aspects of the original claims are not taught by Batten. The office does agree that Batten does not disclose the newly added aspects set fourth in the currently amended claims, and these amended claims will be addressed below in the 35 U.S.C. 103 rejection section of this action.

2. The office disagrees with the assertion that Batten "teaches away from Applicant's claims" when considering either the original claims or the currently amended claims. On page 16 of applicant's response, applicant makes reference to column 1, line 60 of Batten where it states that "The parameters of a neural processing network and of the interconnection pattern of the network and the weights of the neurons must be chosen for each particular application. The term "training" is often used to describe the selection of the parameters. If a network interconnection pattern is fixed, then training is

performed by determining the appropriate weight values." Applicant further states that "Batten teaches that training is only valid for a specific application and thus does not teach or suggest and in fact teaches away from combining of summed weighted accuracy scores, with these sums further subjected to additional weighting factors chosen to suit the needs of diverse applications". The cited caption taken from Batten is taken from the field and background section of the patent and is general description of "a neural processing network", and this description would be well known to one of ordinary skill in the art as background information. This description is not understood to be a deficiency of any of the embodiments of Batten's invention. One of ordinary skill in the art would be well aware that when a network is trained using a particular dataset, the network will only perform well on target data sharing characteristics similar to the training data.

3. Regarding claims 6, 7, 8, 9, 10, 11, 12, 14, 15, 21, 22, 23, 24, 25, 26, 27, 29, and 30, rejected under 35 U.S.C. 103, applicant states that the claims "recite features similar to that discussed supra regarding independent claims 1 and 16", and that the secondary references Butler, Yoshizawa, Thiesson, Hoffberg, and Li do not make up for the deficiencies of Batten with respect to these claims. Applicant's arguments with respect to amended claims 1-30 have been considered but are moot in view of the new ground(s) of rejection necessitated by the amendments.

Claim Objections

Art Unit: 2624

4. Claim 16 is objected to because of the following informalities: The limitation "slimming_ weighted accuracy scores" on line 16 of the claim. Since, the this change was not underlined to indicate and intended amendment, the office assumes that this change from the original change is merely a typo, and the word "summing" will be substituted for "slimming" for the purpose of this office action. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. As per claim 1, Batten teaches a method for evaluating a computer learning signal processing engine, comprising:

identifying a first group of signal sets (Batten: col 5, line 63: "subscript digits 0 and 1 are used to identify the states...state i ($i=0$ or 1)"), each signal set of the first group having an associated range of values for a variable corresponding to the first group (Batten: col 1, line 55: "two-state signal"), the variable being one of a plurality of variables having values characterizing multiple signals to be processed (Batten: col 1, line 16: "artificial neuron comprises a number of input signal paths, $x_{sub.0}$, $x_{sub.1}$, . . . $x_{sub.n}$ ");

calculating an accuracy score for each signal set of the first group using the signal

processing engine to be evaluated (Batten: col 1, line 51: "backpropagation algorithm for training"); applying weight factors to the accuracy scores for the first group signal sets, each weight factor representing a relative importance of one of the associated ranges of values for the first variable (Batten: Fig. 8: element 3); summing weighted accuracy scores for the first group of signal sets to yield a fast summed accuracy score (Batten: Fig. 8: element 4); identifying additional groups of signal sets, each group having a corresponding variable of the plurality of variables, each signal set of a group having an associated range of values for the corresponding variable (Batten: col 11, line 17: "After suitable conditions have been set into all of the latches by a start-up or initialization routine, the network input at time k (with $k = rm + t$), is the input corresponding to $T_{sub.1}$. Since the output at time k corresponds to $T_{sub.1}$, information fed back through signal paths 45 and 46 is combined with input data in Layer 0. The following clock cycles cause this data to be passed through the adder network, until, after m cycles, all additions have been done and the saturated sum appears at the output of latch 44"); calculating accuracy scores for each signal set of each additional group using the signal processing engine to be evaluated (Batten Fig. 12A: element 26); applying weight factors to the accuracy scores for the signal sets of the additional groups, the weight factors within each of the additional groups representing a relative importance of associated ranges of values for the variable corresponding to the group (Batten Fig. 12A: element 47); summing the weighted accuracy scores within each of the additional groups to yield additional summed accuracy scores (Batten Fig. 12A: element 42; further combining the summed accuracy scores: Fig. 12A: element 43); and create one

Art Unit: 2624

or more signal processing engines to handle multiple applications to one or more new groups of signal sets (Batten: abstract: "The present invention may be used in many diverse areas. For example, arrays of sensors with delta signal modulators may be coupled with a network of the neurons to form an intelligent vision system. Linear signal processing").

7. Batten does not teach using summed accuracy scores from at least two separate training sets to create one or more signal processing engines to handle multiple applications to one or more new groups of signal sets for which a frequency of features characteristic of the separate training sets are known or assumed, by weighting the summed accuracy score associated with each training set according to the frequency and then combining the weighted summed accuracy scores.

8. Bellegarda teaches using summed accuracy scores (Bellegarda: col 8, line 13 – col 9, line 67: "L1...L2...SL1...SL2"; Fig. 1: 28, 30, 32, 34, 36, 38, and 40; Fig. 2: 52-58) from at least two separate training sets (Bellegarda: col 3, line 63 – col 4, line 4: "a user's speech is converted to a first signal; a user's handwriting is converted to a second signal; and the first signal and the second signal are processed to decode a consistent message conveyed separately by the first signal and by the second signal"; Figs. 1 and 2: 20 and 22) to create one or more signal processing engines to handle multiple applications (Bellegarda: col 3, lines 53-63: "The invention exploits a complementarity of acoustic and stroke information to provide method and apparatus

having improved message recognition accuracy relative to either speech recognition or handwriting recognition alone.”; Fig. 1: 24-44; Fig. 2: 24-44) to one or more new groups of signal sets (Bellegarda: col 5, lines 15-25: “information generated by a human subject and entered into the system... may represent individual characters, including numbers, letters of the alphabet, punctuation and the like. The information may also represent words, phrases, and paragraphs”; col 5, lines 53-67: “Handwritten characters generally fall into the four groups depicted in FIG. 3”: Fig. 3; col 7, lines 6-29: “final message recognition”; col 7, lines 30-50: “general classes of phonemes”; Fig. 1 and 2: 12 and 16; Fig. 5: 60) for which a frequency of features characteristic of the separate training sets are known or assumed (Bellegarda: col 10, lines 10-50: “In the foregoing example, .alpha. and .beta. may be the weights 37 or some overriding values (W.sub.OVR) selected by the user... manual or automatic weight override”; col 9, lines 10-67: “Assuming”), by weighting the summed accuracy score associated with each training set according to the frequency (Bellegarda: col 4, lines 14-25: “The multi-dimensional vectors are employed to train the parameters of a set of combined word models, for a combined use of speech and handwriting, or to train two sets of word models, for separate use during speech and handwriting recognition. During use, the probabilities, or likelihoods, of each input feature vector are computed using the appropriate set(s) of word models to generate a list or lists of candidate words. A candidate word is selected as representing a message based upon criteria including the probability score and, for the separate-use message recognition system, two weighting factors derived during training of the models”; col 7, lines 5-30: “In addition, a function of each of the training

processors 28 and 30 is to determine optimal weights (W) 37, represented as .alpha. and .beta., that govern the relative contribution of speech and handwriting to the final message recognition. For example, if during training on a specific set of training data speech is found to provide a higher likelihood, or score, than handwriting, the weight associated with the speech likelihood is increased and the weight associated with the handwriting likelihood is decreased. If the two likelihood scores are found to be comparable the weights are set to be the same, i.e. 0.5.”; Fig. 1: 24-30, 37, 42; Fig. 2: 24-58; Fig. 4(a-f); Fig. 5: 62) and then combining the weighted summed accuracy scores (Bellegarda: col 9, lines 10-67: “For any sl.sub.1 and sl.sub.2 corresponding to the same word in SL.sub.1 and SL.sub.2, respectively, a merged likelihood (l) is computed... $f(\text{sl.sub.1}, \text{sl.sub.2}, .\text{alpha.}, .\text{beta.}) = (. \text{alpha.} \cdot \text{sl.sub.1} + . \text{beta.} \cdot \text{sl.sub.2})$, where $. \text{alpha.} + . \text{beta.} = 1$ ”; Fig. 1: 28-44; Fig. 2: 52-58 and 44).

9. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Bellegarda into Batten since Batten suggests a pattern recognition system that can be used in many diverse applications in general and Bellegarda suggests the beneficial use of weighting for combining the results of separate speech and handwriting recognition applications as to “improve an overall accuracy, in terms of throughput, of an automatic recognizer” (Bellegarda: col 3, lines 53-60) in the analogous art of image processing.

10. As per claim 2, Batten in view of Bellegarda teaches the method of claim 1, wherein at least some of the associated ranges of values are single values (Batten: col 5, line 63: "subscript digits 0 and 1 are used to identify the states...state i ($i=0$ or 1)").

11. As per claim 3, Batten in view of Bellegarda teaches the method of claim 1, wherein said further combining the summed accuracy scores comprises: applying weight factors to a plurality of the summed accuracy scores, each of the weight factors applied to the plurality of summed accuracy scores representing a relative importance of the variable corresponding to the group from which a different one of the plurality of summed accuracy scores was derived (Batten Fig. 12A: element 47), and summing the plurality of weighted summed accuracy scores to yield a subsequent sum (Batten Fig. 12A: element 42 (layer 1)).

12. As per claim 4, Batten in view of Bellegarda teaches the method of claim 3, wherein said further combining the summed accuracy scores comprises: applying additional weight factors to the subsequent sum and to at least one of the summed accuracy scores (Batten Fig. 12A: element 47), the additional weight factors representing the relative importance of at least one variable corresponding to groups from which the subsequent sum was derived and of the variable corresponding to the group from which the at least one summed accuracy score was derived (Batten: col 5, line 64: "quantity $w_{sub,j,i}$ is the product of $x_{sub,j}$ and $w_{sub,j}$, for $x_{sub,j}$ in state i ($i=0$ or 1)"; Fig. 18: "W"), and summing the additionally weighted subsequent sum and the

additionally weighted at least one summed accuracy score (Batten Fig. 12A: element 42 (layer 1)).

13. As per 5, Batten in view of Bellegarda teaches the method of claim 3, further comprising:

14. identifying an additional variable having values characterizing multiple signals to be processed (Batten: col 1, line 16: "artificial neuron comprises a number of input signal paths, $x_{sub.0}$, $x_{sub.1}$, . . . $x_{sub.n}$ ": "n" is arbitrary); identifying another group of signal sets (Batten: col 5, line 63: "subscript digits 0 and 1 are used to identify the states...state i ($i=0$ or 1)"), each signal set of the group having an associated range of values for the additional variable (Batten: col 1, line 55: "two-state signal"); calculating an accuracy score for each signal set of the additional variable group using the signal processing engine to be evaluated (Batten: col 1, line 51: "backpropagation algorithm for training"); applying weight factors to the accuracy scores for the additional group signal sets, each weight factor representing a relative importance of one of the associated ranges of values for the additional variable (Batten: Fig. 8: element 3); summing weighted accuracy scores for additional group signal sets to yield an additional summed accuracy score (Batten: Fig. 8: element 4);

15. applying weight factors to the plurality of the summed accuracy scores and to the

16. additional summed accuracy score, each of the weight factors representing a relative importance of the variable corresponding to the group from which a different one of the plurality of summed accuracy scores was derived or of the additional variable

(Batten: Fig. 18: "W"), and summing the plurality of weighted summed accuracy scores and the weighted additional accuracy score (Batten: Fig. 18: 91).

17. As per claim 13, Batten in view of Bellegarda teaches the method of claim 1, further comprising applying a transforming function to a sum (Batten: col 1, line 23: "an element which transforms the intermediate signal u (usually by a nonlinear function F) to produce the output signal y ").

18. As per claim 16, Batten teaches a computer-readable medium having stored thereon data representing sequences of instructions which, when executed by a processor, cause the processor to perform steps comprising:
identifying a first group of signal sets (Batten: col 5, line 63: "subscript digits 0 and 1 are used to identify the states...state i ($i=0$ or 1)"), each signal set of the first group having an associated range of values for a variable corresponding to the first group (Batten: col 1, line 55: "two-state signal"), the variable being one of a plurality of variables having values characterizing multiple signals to be processed (Batten: col 1, line 16: "artificial neuron comprises a number of input signal paths, $x_{sub.0}$, $x_{sub.1}$, . . . $x_{sub.n}$ ");
calculating an accuracy score for each signal set of the first group using the signal processing engine to be evaluated (Batten: col 1, line 51: "backpropagation algorithm for training"); applying weight factors to the accuracy scores for the first group signal sets, each weight factor representing a relative importance of one of the associated ranges of values for the first variable (Batten: Fig. 8: element 3); summing weighted

accuracy scores for the first group of signal sets to yield a fast summed accuracy score (Batten: Fig. 8: element 4); identifying additional groups of signal sets, each group having a corresponding variable of the plurality of variables, each signal set of a group having an associated range of values for the corresponding variable (Batten: col 11, line 17: "After suitable conditions have been set into all of the latches by a start-up or initialization routine, the network input at time k (with $k=rm+t$), is the input corresponding to $T_{sub.1}$. Since the output at time k corresponds to $T_{sub.1}$, information fed back through signal paths 45 and 46 is combined with input data in Layer 0. The following clock cycles cause this data to be passed through the adder network, until, after m cycles, all additions have been done and the saturated sum appears at the output of latch 44"); calculating accuracy scores for each signal set of each additional group using the signal processing engine to be evaluated (Batten Fig. 12A: element 26); applying weight factors to the accuracy scores for the signal sets of the additional groups, the weight factors within each of the additional groups representing a relative importance of associated ranges of values for the variable corresponding to the group (Batten Fig. 12A: element 47); summing the weighted accuracy scores within each of the additional groups to yield additional summed accuracy scores (Batten Fig. 12A: element 42); and further combining the summed accuracy scores (Batten Fig. 12A: element 43); and create one or more signal processing engines to handle multiple applications to one or more new groups of signal sets (Batten: abstract: "The present invention may be used in many diverse areas. For example, arrays of sensors with delta signal modulators may be coupled with a network of the neurons to form an intelligent vision system. Linear

signal processing”).

19. Batten does not teach using summed accuracy scores from at least two separate training sets to create one or more signal processing engines to handle multiple applications to one or more new groups of signal sets for which a frequency of features characteristic of the separate training sets are known or assumed, by weighting the summed accuracy score associated with each training set according to the frequency and then combining the weighted summed accuracy scores.

20. Bellegarda teaches using summed accuracy scores (Bellegarda: col 8, line 13 – col 9, line 67: “L1...L2...SL1...SL2”; Fig. 1: 28, 30, 32, 34, 36, 38, and 40; Fig. 2: 52-58) from at least two separate training sets (Bellegarda: col 3, line 63 – col 4, line 4: “a user’s speech is converted to a first signal; a user’s handwriting is converted to a second signal; and the first signal and the second signal are processed to decode a consistent message conveyed separately by the first signal and by the second signal”; Figs. 1 and 2: 20 and 22) to create one or more signal processing engines to handle multiple applications (Bellegarda: col 3, lines 53-63: “The invention exploits a complementarity of acoustic and stroke information to provide method and apparatus having improved message recognition accuracy relative to either speech recognition or handwriting recognition alone.”; Fig. 1: 24-44; Fig. 2: 24-44) to one or more new groups of signal sets (Bellegarda: col 5, lines 15-25: “information generated by a human subject and entered into the system... may represent individual characters, including numbers,

Art Unit: 2624

letters of the alphabet, punctuation and the like. The information may also represent words, phrases, and paragraphs"; col 5, lines 53-67: "Handwritten characters generally fall into the four groups depicted in FIG. 3": Fig. 3; col 7, lines 6-29: "final message recognition"; col 7, lines 30-50: "general classes of phonemes"; Fig. 1 and 2: 12 and 16; Fig. 5: 60) for which a frequency of features characteristic of the separate training sets are known or assumed (Bellegarda: col 10, lines 10-50: "In the foregoing example, .alpha. and .beta. may be the weights 37 or some overriding values (W.sub.OVR) selected by the user... manual or automatic weight override"; col 9, lines 10-67: "Assuming"), by weighting the summed accuracy score associated with each training set according to the frequency (Bellegarda: col 4, lines 14-25: "The multi-dimensional vectors are employed to train the parameters of a set of combined word models, for a combined use of speech and handwriting, or to train two sets of word models, for separate use during speech and handwriting recognition. During use, the probabilities, or likelihoods, of each input feature vector are computed using the appropriate set(s) of word models to generate a list or lists of candidate words. A candidate word is selected as representing a message based upon criteria including the probability score and, for the separate-use message recognition system, two weighting factors derived during training of the models"; col 7, lines 5-30: "In addition, a function of each of the training processors 28 and 30 is to determine optimal weights (W) 37, represented as .alpha. and .beta., that govern the relative contribution of speech and handwriting to the final message recognition. For example, if during training on a specific set of training data speech is found to provide a higher likelihood, or score, than handwriting, the weight

associated with the speech likelihood is increased and the weight associated with the handwriting likelihood is decreased. If the two likelihood scores are found to be comparable the weights are set to be the same, i.e. 0.5.”; Fig. 1: 24-30, 37, 42; Fig. 2: 24-58; Fig. 4(a-f); Fig. 5: 62) and then combining the weighted summed accuracy scores (Bellegarda: col 9, lines 10-67: “For any $sl.sub.1$ and $sl.sub.2$ corresponding to the same word in $SL.sub.1$ and $SL.sub.2$, respectively, a merged likelihood (l) is computed... $f(sl.sub.1, sl.sub.2, .alpha., .beta.) = (.alpha.sl.sub.1 + .beta.sl.sub.2)$, where $.alpha.+ .beta.=1$ ”; Fig. 1: 28-44; Fig. 2: 52-58 and 44).

21. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Bellegarda into Batten since Batten suggests a pattern recognition system that can be used in many diverse applications in general and Bellegarda suggests the beneficial use of weighting for combining the results of separate speech and handwriting recognition applications as to “improve an overall accuracy, in terms of throughput, of an automatic recognizer” (Bellegarda: col 3, lines 53-60) in the analogous art of image processing.

22. As per claim 17, Batten in view of Bellegarda teaches the computer-readable medium of claim 16, wherein at least some of the associated ranges of values are single values (Batten: col 5, line 63: “subscript digits 0 and 1 are used to identify the states...state i ($i=0$ or 1)”).

23. As per claim 18, Batten in view of Bellegarda teaches the computer-readable medium of claim 16, wherein said further combining the summed accuracy scores comprises: applying weight factors to a plurality of the summed accuracy scores, each of the weight factors applied to the plurality of summed accuracy scores representing a relative importance of the variable corresponding to the group from which a different one of the plurality of summed accuracy scores was derived (Batten Fig. 12A: element 47), and summing the plurality of weighted summed accuracy scores to yield a subsequent sum (Batten Fig. 12A: element 42 (layer 1)).

24. As per claim 19, Batten in view of Bellegarda teaches the computer-readable medium of claim 18, wherein said further combining the summed accuracy scores comprises:
applying additional weight factors to the subsequent sum and to at least one of the summed accuracy scores (Batten Fig. 12A: element 47), the additional weight factors representing the relative importance of at least one variable corresponding to groups from which the subsequent sum was derived and of the variable corresponding to the group from which the at least one summed accuracy score was derived (Batten: col 5, line 64: "quantity $w_{sub,j,i}$ is the product of $x_{sub,j}$ and $w_{sub,j}$, for $x_{sub,j}$ in state i ($i=0$ or 1)"; Fig. 18: "W"), and summing the additionally weighted subsequent sum and the additionally weighted at least one summed accuracy score (Batten Fig. 12A: element 42 (layer 1)).

25. As per 20, Batten in view of Bellegarda teaches the computer-readable medium of claim 18, further comprising:

26. identifying an additional variable having values characterizing multiple signals to be processed (Batten: col 1, line 16: "artificial neuron comprises a number of input signal paths, $x_{sub.0}$, $x_{sub.1}$, . . . $x_{sub.n}$ ": "n" is arbitrary); identifying another group of signal sets (Batten: col 5, line 63: "subscript digits 0 and 1 are used to identify the states...state i ($i=0$ or 1)"), each signal set of the group having an associated range of values for the additional variable (Batten: col 1, line 55: "two-state signal"); calculating an accuracy score for each signal set of the additional variable group using the signal processing engine to be evaluated (Batten: col 1, line 51: "backpropagation algorithm for training"); applying weight factors to the accuracy scores for the additional group signal sets, each weight factor representing a relative importance of one of the associated ranges of values for the additional variable (Batten: Fig. 8: element 3); summing weighted accuracy scores for additional group signal sets to yield an additional summed accuracy score (Batten: Fig. 8: element 4);

27. applying weight factors to the plurality of the summed accuracy scores and to the

28. additional summed accuracy score, each of the weight factors representing a relative importance of the variable corresponding to the group from which a different one of the plurality of summed accuracy scores was derived or of the additional variable (Batten: Fig. 18: "W"), and summing the plurality of weighted summed accuracy scores and the weighted additional accuracy score (Batten: Fig. 18: 91).

Art Unit: 2624

29. As per claim 28, Batten in view of Bellegarda teaches the computer-readable medium of claim 16, further comprising applying a transforming function to a sum (Batten: col 1, line 23: "an element which transforms the intermediate signal u (usually by a nonlinear function F) to produce the output signal y ").

30. Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5768478 (Batten) in view of USPN 6285785 (Bellegarda) as applied to claim 1 above, and further in view of USPN 5097141 (Thiesson)

31. As per claim 6, Batten in view of Bellegarda teaches the method of claim 1, further comprising selecting a variable of the plurality of variables (Batten: col 1, line 16: "artificial neuron comprises a number of input signal paths, $x_{sub.0}$, $x_{sub.1}$, . . . $x_{sub.n}$ "); calculating an accuracy score for signal sets in groups of signal sets corresponding to the variables (Batten: Fig. 8: element 4); applying weights to the accuracy scores for the signal sets in each variable group (Batten Fig. 12A: element 47) and summing the weighted scores within each of said groups to yield variable accuracy scores (Batten Fig. 12A: element 42 (layer 1)); and applying weights to the variable accuracy scores (Batten: Fig. 18: "W") and summing the weighted variable accuracy scores (Batten: Fig. 18: 91).

32. Batten does not teach selecting sub-variables, each sub-variable having a range of values for a value of the selected variable; each of the signal sets within a group corresponding to a range of values for the corresponding sub-variable.

33. Thiesson teaches selecting sub-variables, each sub-variable having a range of values for a value of the selected variable (Thiesson: col 8, line 9: "The user-specific features 506 are comprised of sub-features, F.sub.pl F.sub.pn, 508 512. Formally, the full feature set $F = F.sub.g.orgate.F.sub.p1.orgate.F.sub.p2.orgate. . . .orgate.F.sub.pn$, where F.sub.g are the generic features and F.sub.pi, $i = 1, . . . , n$ are subsets of the user-specific features."); each of the signal sets within a group corresponding to a range of values for the corresponding sub-variable (Thiesson: col 9, line 24: "group of characters ... Thus, any row with a number "1" indicates it has a like sub-feature").

34. Thiesson provides the motivation for using sub-variables on col 8, line 15: "generic classifier for the shape sub-feature can easily discern between an "A" and a "B"".

35. The rationale to combine these references is that Batten teaches all limitations of claim when considering variables instead of sub-variables. It would have been obvious for one skilled in the art at the time of the invention to substitute sub-variables for variables.

36. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Thiesson into Batten since Batten suggests a pattern recognitions routine with a plurality of variables in general and Thiesson suggests the beneficial use of sub-variables in the analogous art of handwriting recognition.

37. As per claim 21, Batten in view of Bellegarda teaches the computer-readable medium of claim 16, further comprising selecting a variable of the plurality of variables (Batten: col 1, line 16: "artificial neuron comprises a number of input signal paths, x.sub.0, x.sub.1, . . . x.sub.n"); calculating an accuracy score for signal sets in groups of signal sets corresponding to the variables (Batten: Fig. 8: element 4); applying weights to the accuracy scores for the signal sets in each variable group (Batten Fig. 12A: element 47) and summing the weighted scores within each of said groups to yield variable accuracy scores (Batten Fig. 12A: element 42 (layer 1)); and applying weights to the variable accuracy scores (Batten: Fig. 18: "W") and summing the weighted variable accuracy scores (Batten: Fig. 18: 91).

38. Batten does not teach selecting sub-variables, each sub-variable having a range of values for a value of the selected variable; each of the signal sets within a group corresponding to a range of values for the corresponding sub-variable.

39. Thiesson teaches selecting sub-variables, each sub-variable having a range of values for a value of the selected variable (Thiesson: col 8, line 9: "The user-specific features 506 are comprised of sub-features, F.sub.pl F.sub.pn, 508 512. Formally, the full feature set $F = F.sub.g.orgate.F.sub.p1.orgate.F.sub.p2.orgate. . . .orgate. F.sub.pn$, where F.sub.g are the generic features and F.sub.pi, $i=1, . . . , n$ are subsets of the user-specific features."); each of the signal sets within a group corresponding to a range of values for the corresponding sub-variable (Thiesson: col 9, line 24: "group of characters ...Thus, any row with a number "1" indicates it has a like sub-feature").

40. Claims 7, 8, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5768478 (Batten) in view of USPN 6285785 (Bellegarda) as applied to claim 1 above, and further in view of USPN 7136710 (Hoffberg).

41. As per claim 7, Batten in view of Bellegarda teaches the method of claim 1. Batten in view of Bellegarda does not teach at least one variable is a source variable having values characterizing a source of a signal to be processed, at least one variable is a context variable having values characterizing the context of a signal to be processed, and at least one variable is a physical variable having values characterizing physical attributes of a signal to be processed.

42. Hoffberg teaches at least one variable is a source variable having values characterizing a source of a signal to be processed (Hoffberg: col 82, line 14: "Thus, the

interface, in obtaining necessary information, employs such available data source access methods as speech recognition, character recognition, digital telecommunication means, radio wave reception and interpretation, and links to other devices."), at least one variable is a context variable having values characterizing the context of a signal to be processed (Hoffberg: col 32, line 45: "context refers to information relating to the environment of use, e.g., the variable"), and at least one variable is a physical variable having values characterizing physical attributes of a signal to be processed (Hoffberg: col 37, line 37: "Faces, on the other hand, have common and variable elements. Therefore, a facial model may be based on parameters having distinguishing power, such as width between eyes, mouth, shape of ears, and other proportions and dimension").

43. Hoffberg provides the motivation for using these particular variables on col 1–line 23: "The present invention provides an enhanced interface for facilitating human input of a desired information and for modifying information previously entered information".

44. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Hoffberg into Batten since Batten suggests a multivariate pattern recognition system in general and Hoffberg suggests the beneficial use of a variables pertaining to context, source, and physical attributes in the analogous art of pattern recognition.

45. As per claim 8, Batten in view of Bellegarda teaches the computer-readable medium of claim 7. Batten in view of Bellegarda does not teach at least one variable has values characterizing a user scenario in which a signal was generated, the user scenario values including at least one of a software application and an operation performed within a software application.

46. Hoffberg teaches at least one variable has values characterizing a user scenario in which a signal was generated (Hoffberg: col 66, line 58: "It should be noted that the present system preferably detects an identity of a user, and therefore differentiates between different users by an explicit or implicit identification system. Therefore, the system may accumulate information regarding users without confusion or intermingling"), the user scenario values including at least one of a software application and an operation performed within a software application (Hoffberg: col 1, line 22: "The present invention relates to the field of programmable man-machine interfaces").

47. As per claim 22, Batten in view of Bellegarda teaches the computer-readable medium of claim 16. Batten in view of Bellegarda does not teach at least one variable is a source variable having values characterizing a source of a signal to be processed, at least one variable is a context variable having values characterizing the context of a signal to be processed, and at least one variable is a

Art Unit: 2624

physical variable having values characterizing physical attributes of a signal to be processed.

48. Hoffberg teaches at least one variable is a source variable having values characterizing a source of a signal to be processed (Hoffberg: col 82, line 14: "Thus, the interface, in obtaining necessary information, employs such available data source access methods as speech recognition, character recognition, digital telecommunication means, radio wave reception and interpretation, and links to other devices."), at least one variable is a context variable having values characterizing the context of a signal to be processed (Hoffberg: col 32, line 45: "context refers to information relating to the environment of use, e.g., the variable"), and at least one variable is a physical variable having values characterizing physical attributes of a signal to be processed (Hoffberg: col 37, line 37: "Faces, on the other hand, have common and variable elements. Therefore, a facial model may be based on parameters having distinguishing power, such as width between eyes, mouth, shape of ears, and other proportions and dimension").

49. As per claim 23, Batten in view of Bellegarda teaches the computer-readable medium of claim 22. Batten in view of Bellegarda does not teach at least one variable has values characterizing a user scenario in which a signal was generated, the user scenario values including at least one of a software application and an operation

performed within a software application.

50. Hoffberg at least one variable has values characterizing a user scenario in which a signal was generated (Hoffberg: col 66, line 58: "It should be noted that the present system preferably detects an identity of a user, and therefore differentiates between different users by an explicit or implicit identification system. Therefore, the system may accumulate information regarding users without confusion or intermingling"), the user scenario values including at least one of a software application and an operation performed within a software application (Hoffberg: col 1, line 22: "The present invention relates to the field of programmable man-machine interfaces").

51. Claims 9, 10, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5768478 (Batten) in view of USPN 6285785 (Bellegarda) and 7136710 (Hoffberg) as applied to claim 8 above, and further in view of USPN 7184591 (Thiesson).

52. As per claim 9, Hoffberg teaches the method of claim 8, wherein: the signal processing engine to be evaluated comprises recognition software (Hoffberg: col 1, line 22: "The present invention relates to the field of programmable man-machine interfaces"), values of the source variable comprise demographic data regarding users creating samples (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), values of

Art Unit: 2624

the context variable comprise data regarding the context of samples (Hoffberg: col 32, line 45: "context refers to information relating to the environment of use, e.g., the variable"), and values of the physical variable (Hoffberg: col 37, line 37: "Faces, on the other hand, have common and variable elements. Therefore, a facial model may be based on parameters having distinguishing power, such as width between eyes, mouth, shape of ears, and other proportions and dimension") comprise at least one of data regarding the scaling (Hoffberg: col 47, line 60: "group consisting of a ... predetermined scaling") of a sample, data regarding the relative angle (Hoffberg: col 47, line 60: "group consisting of a predetermined rotation") of components of a sample and data regarding the spacing between components of a sample (Hoffberg: col 107, line 64: "In a preferred embodiment, a model contained in a database includes a three or more dimensional representation of an object. These models include information processed by a fractal-based method to encode repetitive, transformed patterns in a plane, space, time, etc"). Hoffberg does not teach the signals to be processed comprise handwriting samples.

53. Thiesson teaches the signal processing engine to be evaluated comprises handwriting recognition software (Thiesson: col 4, line 46: "The present invention also greatly enhances portable software products"), the signals to be processed comprise handwriting samples (Thiesson: abstract: "The present invention utilizes generic and user-specific features of handwriting samples to provide adaptive handwriting

recognition"), values of the physical variable comprise at least one of data regarding the scaling of a handwriting sample (Thiesson: Fig 6. 606-608).

54. Thiesson provides the motivation for performing handwriting recognition on col 1 – line 39: "Unfortunately, not everyone who wanted to utilize a computer knew how to type. This limited the number of computer users who could adequately utilize the computing technology. One solution was to introduce a graphical user interface that allowed a user to select pictures from a computing monitor to make the computer do a task ... Although, these types of devices made employing computing technology easier, it still did not address mankind's age old method of communicating--handwriting".

55. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Thiesson into Batten since Batten suggests a pattern recognitions routine with a plurality of variables in general and Thiesson suggests the beneficial use of sub-variables in the analogous art of handwriting recognition.

56. As per claim 10, Batten in view of Bellegarda teaches at least the summed accuracy scores for signal set, signal set and signal set groups of signals having a common variable value are weighted and summed to yield context accuracy scores (Batten Fig. 12A: element 47),

57. accuracy scores are weighted and summed to yield a combined accuracy score, the combined accuracy score and at least one other summed accuracy score are weighted and summed to yield a accuracy score (Batten Fig. 12A: element 42), and

58. at least the accuracy score and a summed accuracy score for a group corresponding to the variable are weighted and summed to yield an overall accuracy score (Batten Fig. 12A: element 43).

59. Batten does not teach the method of claim 9, wherein: the groups of signal sets comprise: groups of demographic signal sets, each demographic signal set in a group having an associated range of values for the source variable and the same value for the context variable, groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a handwriting sample and the same value for the context variable, and groups of angle signal sets, each angle signal set in a group having an associated range of values for at least one angle of a component of a handwriting sample and the same value for the context variable.

60. Hoffberg teaches the method of claim 9, wherein:
the groups of signal sets comprise: groups of demographic signal sets (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), each demographic signal set in a group having an associated range of values for the source variable (Hoffberg: col 36, line 57: "demographic profiles may be employed, rather than individual preferences ... the source

material has little variety, or is not the subject of strong preferences, the predictive power of the device as to a desired selection is limited") and the same value for the context variable (Hoffberg: col 82, line 14: "Thus, the interface, in obtaining necessary information, employs such available data source access methods as speech recognition, character recognition, digital telecommunication means, radio wave reception and interpretation, and links to other devices."; col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"), groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 60: "group consisting of a ... predetermined scaling"), and groups of angle signal sets, each angle signal set in a group having an associated range of values for at least one angle of a component of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 59: "group consisting of a predetermined rotation"),

61. Hoffberg provides the motivation for using demographic signal sets on col 36 – line 50: "Thus, instead of a best match to a single preference profile for a single user, a group system provides a most acceptable match for the group. It is noted that this

method is preferably used in groups of limited size". Hoffberg provides the motivation for context signal sets on col 28— line 17: "One factor limiting productivity of computer operators is the time necessary to communicate a desired action through an interface to a computerized device. The present technologies seek to reduce this limitation and make use of surplus processing capacity of the computer to predict a most likely input from the operator and present this as an easily available option". Hoffberg provides the motivation for using scaling and angle signals on col 2 – line 3: "certain displays are of small size, and thus the visibility of the information may also be optimized by taking into consideration the size, resolution, contrast, brightness of the display, ambient conditions, characteristics of the human visual system, factors specific for a known user, and the available options of the apparatus"

62. Thiesson teaches context accuracy score (Thiesson: col 3, line 10: col 2, line 44: "Should a computing system fail to "comprehend" the name, it can utilize "context" such as what state a piece of mail is from and if the system recognize at least some of the characters in the city name"; "In this context, methods are employed to accurately interpret and exploit what a user inputs over a period of time"), word accuracy score (Thiesson: col 6, line 16: "The present invention includes systems and methods that enable adaptation of a general classification model to a specific user in order to improve classification"), and overall accuracy score (Thiesson: col 1, line 66: "At first, this technology had an accuracy of about 50 to 60%, but today it has progressed to an accuracy of near 98 to 99% or higher").

63. Thiesson teaches the signals to be processed comprise handwriting samples (Thiesson: abstract: "The present invention utilizes generic and user-specific features of handwriting samples to provide adaptive handwriting recognition")

64. Thiesson provides the motivation for determining the accuracy of a system col 2 – line 5: "OCR technology reached an accuracy level where it seemed practical to attempt to utilize it to recognize handwriting".

65. As per claim 24, Hoffberg teaches the computer-readable medium of claim 23, wherein:
the signal processing engine to be evaluated comprises recognition software (Hoffberg: col 1, line 22: "The present invention relates to the field of programmable man-machine interfaces"), values of the source variable comprise demographic data regarding users creating samples (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), values of the context variable comprise data regarding the context of samples (Hoffberg: col 32, line 45: "context refers to information relating to the environment of use, e.g., the variable"), and values of the physical variable (Hoffberg: col 37, line 37: "Faces, on the other hand, have common and variable elements. Therefore, a facial model may be based on parameters having distinguishing power, such as width between eyes, mouth, shape of ears, and other proportions and dimension") comprise at least one of data

regarding the scaling (Hoffberg: col 47, line 60: "group consisting of a ... predetermined scaling") of a sample, data regarding the relative angle (Hoffberg: col 47, line 60: "group consisting of a predetermined rotation") of components of a sample and data regarding the spacing between components of a sample (Hoffberg: col 107, line 64: "In a preferred embodiment, a model contained in a database includes a three or more dimensional representation of an object. These models include information processed by a fractal-based method to encode repetitive, transformed patterns in a plane, space, time, etc"). Hoffberg does not teach the signals to be processed comprise handwriting samples.

66. Thiesson teaches the signal processing engine to be evaluated comprises handwriting recognition software (Thiesson: col 4, line 46: "The present invention also greatly enhances portable software products"), the signals to be processed comprise handwriting samples (Thiesson: abstract: "The present invention utilizes generic and user-specific features of handwriting samples to provide adaptive handwriting recognition"), values of the physical variable comprise at least one of data regarding the scaling of a handwriting sample (Thiesson: Fig 6. 606-608).

67. Thiesson provides the motivation for performing handwriting recognition on col 1 – line 39: "Unfortunately, not everyone who wanted to utilize a computer knew how to type. This limited the number of computer users who could adequately utilize the computing technology. One solution was to introduce a graphical user interface that allowed a user to select pictures from a computing monitor to make the computer do a

task ... Although, these types of devices made employing computing technology easier, it still did not address mankind's age old method of communicating--handwriting".

68. As per claim 25, Batten in view of Bellegarda teaches at least the summed accuracy scores for signal set, signal set and signal set groups of signals having a common variable value are weighted and summed to yield context accuracy scores (Batten Fig. 12A: element 47),

69. accuracy scores are weighted and summed to yield a combined accuracy score, the combined accuracy score and at least one other summed accuracy score are weighted and summed to yield a accuracy score (Batten Fig. 12A: element 42), and

70. at least the accuracy score and a summed accuracy score for a group corresponding to the variable are weighted and summed to yield an overall accuracy score (Batten Fig. 12A: element 43).

71. Batten does not teach the computer-readable medium of claim 24, wherein: the groups of signal sets comprise: groups of demographic signal sets, each demographic signal set in a group having an associated range of values for the source variable and the same value for the context variable, groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a handwriting sample and the same value for the context variable, and groups of angle signal sets, each angle signal set in a group having an associated range of values for at

least one angle of a component of a handwriting sample and the same value for the context variable.

72. Hoffberg teaches the method of claim 24, wherein:

the groups of signal sets comprise: groups of demographic signal sets (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), each demographic signal set in a group having an associated range of values for the source variable (Hoffberg: col 36, line 57: "demographic profiles may be employed, rather than individual preferences ... the source material has little variety, or is not the subject of strong preferences, the predictive power of the device as to a desired selection is limited") and the same value for the context variable (Hoffberg: col 82, line 14: "Thus, the interface, in obtaining necessary information, employs such available data source access methods as speech recognition, character recognition, digital telecommunication means, radio wave reception and interpretation, and links to other devices."; col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"), groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 60: "group consisting of a ... predetermined scaling"), and groups of angle signal sets, each angle signal set in a

group having an associated range of values for at least one angle of a component of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 59: "group consisting of a predetermined rotation"),

73. Hoffberg provides the motivation for using demographic signal sets on col 36 – line 50: "Thus, instead of a best match to a single preference profile for a single user, a group system provides a most acceptable match for the group. It is noted that this method is preferably used in groups of limited size". Hoffberg provides the motivation for context signal sets on col 28– line 17: "One factor limiting productivity of computer operators is the time necessary to communicate a desired action through an interface to a computerized device. The present technologies seek to reduce this limitation and make use of surplus processing capacity of the computer to predict a most likely input from the operator and present this as an easily available option". Hoffberg provides the motivation for using scaling and angle signals on col 2 – line 3: "certain displays are of small size, and thus the visibility of the information may also be optimized by taking into consideration the size, resolution, contrast, brightness of the display, ambient conditions, characteristics of the human visual system, factors specific for a known user, and the available options of the apparatus"

74. Thiesson teaches context accuracy score (Thiesson: col 3, line 10: col 2, line 44: "Should a computing system fail to "comprehend" the name, it can utilize "context" such as what state a piece of mail is from and if the system recognize at least some of the characters in the city name"; "In this context, methods are employed to accurately interpret and exploit what a user inputs over a period of time"), word accuracy score (Thiesson: col 6, line 16: "The present invention includes systems and methods that enable adaptation of a general classification model to a specific user in order to improve classification"), and overall accuracy score (Thiesson: col 1, line 66: "At first, this technology had an accuracy of about 50 to 60%, but today it has progressed to an accuracy of near 98 to 99% or higher").

75. Thiesson teaches the signals to be processed comprise handwriting samples (Thiesson: abstract: "The present invention utilizes generic and user-specific features of handwriting samples to provide adaptive handwriting recognition").

76. Thiesson provides the motivation for determining the accuracy of a system col 2 – line 5: "OCR technology reached an accuracy level where it seemed practical to attempt to utilize it to recognize handwriting".

77. Claims 11, 12, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5768478 (Batten) in view of USPN 6285785 (Bellegarda) and

7136710 (Hoffberg) as applied to claim 8 above, and further in view of USPN 7184591 (Thiesson) and USPN 7167587 (Ii).

78. As per claim 11, Hoffberg teaches the method of claim 8, wherein:
the signal processing engine to be evaluated comprises recognition software (Hoffberg: col 1, line 22: "The present invention relates to the field of programmable man-machine interfaces"), values of the source variable comprise demographic data regarding users creating samples (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), values of the context variable comprise data regarding the context of samples (Hoffberg: col 32, line 45: "context refers to information relating to the environment of use, e.g., the variable"), and values of the physical variable (Hoffberg: col 37, line 37: "Faces, on the other hand, have common and variable elements. Therefore, a facial model may be based on parameters having distinguishing power, such as width between eyes, mouth, shape of ears, and other proportions and dimension") comprise at least one of data regarding the scaling (Hoffberg: col 47, line 60: "group consisting of a ... predetermined scaling") of a sample, data regarding the relative angle (Hoffberg: col 47, line 60: "group consisting of a predetermined rotation") of components of a sample and data regarding the spacing between components of a sample (Hoffberg: col 107, line 64: "In a preferred embodiment, a model contained in a database includes a three or more dimensional representation of an object. These models include information processed by a fractal-

Art Unit: 2624

based method to encode repetitive, transformed patterns in a plane, space, time, etc").

Hoffberg does not teach the signals to be processed comprise handwriting samples.

79. Thiesson does not teach the signal processing engine to be evaluated comprises speech recognition; the signals to be processed comprise speech.

80. Li teaches the signal processing engine to be evaluated comprises speech recognition software (li: abstract: "The present invention recites a method and computer program product"), the signals to be processed comprise speech samples (li: col 2, line 51: " The classification method may be applied to any pattern recognition task, including, for example, OCR (optical character recognition), speech translation, and image analysis in medical, military, and industrial applications").

81. For applying this pattern recognition technique to speech samples, one skilled in the art at the time of the invention would use the rationale that speech translation would allow communication for people who do not share a common language.

82. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of li into Batten since Batten suggests pattern recognition via neural networks in general and li suggests the beneficial use of neural networks for speech recognition in the analogous art of pattern recognition.

83. As per claim 12, Batten in view of Bellegarda teaches at least the summed accuracy scores for signal set, signal set and signal set groups of signals having a common variable value are weighted and summed to yield context accuracy scores (Batten Fig. 12A: element 47),

84. accuracy scores are weighted and summed to yield a combined accuracy score, the combined accuracy score and at least one other summed accuracy score are weighted and summed to yield a accuracy score (Batten Fig. 12A: element 42), and

85. at least the accuracy score and a summed accuracy score for a group corresponding to the variable are weighted and summed to yield an overall accuracy score (Batten Fig. 12A: element 43).

86. Batten does not teach the method of claim 11, wherein: the groups of signal sets comprise: groups of demographic signal sets, each demographic signal set in a group having an associated range of values for the source variable and the same value for the context variable, groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a handwriting sample and the same value for the context variable, and groups of angle signal sets, each angle signal set in a group having an associated range of values for at least one angle of a component of a handwriting sample and the same value for the context variable.

87. Hoffberg teaches the method of claim 11, wherein:
the groups of signal sets comprise: groups of demographic signal sets (Hoffberg: col 36,

line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), each demographic signal set in a group having an associated range of values for the source variable (Hoffberg: col 36, line 57: "demographic profiles may be employed, rather than individual preferences ... the source material has little variety, or is not the subject of strong preferences, the predictive power of the device as to a desired selection is limited") and the same value for the context variable (Hoffberg: col 82, line 14: "Thus, the interface, in obtaining necessary information, employs such available data source access methods as speech recognition, character recognition, digital telecommunication means, radio wave reception and interpretation, and links to other devices."; col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"), groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 60: "group consisting of a ... predetermined scaling"), and groups of angle signal sets, each angle signal set in a group having an associated range of values for at least one angle of a component of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 59: "group consisting of a predetermined rotation"),

88. Hoffberg provides the motivation for using demographic signal sets on col 36 – line 50: "Thus, instead of a best match to a single preference profile for a single user, a group system provides a most acceptable match for the group. It is noted that this method is preferably used in groups of limited size". Hoffberg provides the motivation for context signal sets on col 28– line 17: "One factor limiting productivity of computer operators is the time necessary to communicate a desired action through an interface to a computerized device. The present technologies seek to reduce this limitation and make use of surplus processing capacity of the computer to predict a most likely input from the operator and present this as an easily available option". Hoffberg provides the motivation for using scaling and angle signals on col 2 – line 3: "certain displays are of small size, and thus the visibility of the information may also be optimized by taking into consideration the size, resolution, contrast, brightness of the display, ambient conditions, characteristics of the human visual system, factors specific for a known user, and the available options of the apparatus"

89. Thieson teaches context accuracy score (Thieson: col 3, line 10: col 2, line 44: "Should a computing system fail to "comprehend" the name, it can utilize "context" such as what state a piece of mail is from and if the system recognize at least some of the characters in the city name"; "In this context, methods are employed to accurately interpret and exploit what a user inputs over a period of time"), word accuracy score (Thieson: col 6, line 16: "The present invention includes systems and methods that

enable adaptation of a general classification model to a specific user in order to improve classification"), and overall accuracy score (Thiesson: col 1, line 66: "At first, this technology had an accuracy of about 50 to 60%, but today it has progressed to an accuracy of near 98 to 99% or higher").

90. Thiesson provides the motivation for determining the accuracy of a system col 2 – line 5: "OCR technology reached an accuracy level where it seemed practical to attempt to utilize it to recognize handwriting".

91. Thiesson does not teach the signal processing engine to be evaluated comprises speech recognition; the signals to be processed comprise speech.

92. Ii teaches the signal processing engine to be evaluated comprises speech recognition software (Ii: abstract: "The present invention recites a method and computer program product"), the signals to be processed comprise speech samples (Ii: col 2, line 51: " The classification method may be applied to any pattern recognition task, including, for example, OCR (optical character recognition), speech translation, and image analysis in medical, military, and industrial applications").

93. As per claim 26, Hoffberg teaches the computer-readable medium of claim 23, wherein:
the signal processing engine to be evaluated comprises recognition software (Hoffberg:

Art Unit: 2624

col 1, line 22: "The present invention relates to the field of programmable man-machine interfaces"), values of the source variable comprise demographic data regarding users creating samples (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), values of the context variable comprise data regarding the context of samples (Hoffberg: col 32, line 45: "context refers to information relating to the environment of use, e.g., the variable"), and values of the physical variable (Hoffberg: col 37, line 37: "Faces, on the other hand, have common and variable elements. Therefore, a facial model may be based on parameters having distinguishing power, such as width between eyes, mouth, shape of ears, and other proportions and dimension") comprise at least one of data regarding the scaling (Hoffberg: col 47, line 60: "group consisting of a ... predetermined scaling") of a sample, data regarding the relative angle (Hoffberg: col 47, line 60: "group consisting of a predetermined rotation") of components of a sample and data regarding the spacing between components of a sample (Hoffberg: col 107, line 64: "In a preferred embodiment, a model contained in a database includes a three or more dimensional representation of an object. These models include information processed by a fractal-based method to encode repetitive, transformed patterns in a plane, space, time, etc"). Hoffberg does not teach the signals to be processed comprise handwriting samples.

94. Thiesson does not teach the signal processing engine to be evaluated comprises speech recognition; the signals to be processed comprise speech.

95. Li teaches the signal processing engine to be evaluated comprises speech recognition software (li: abstract: "The present invention recites a method and computer program product"), the signals to be processed comprise speech samples (li: col 2, line 51: " The classification method may be applied to any pattern recognition task, including, for example, OCR (optical character recognition), speech translation, and image analysis in medical, military, and industrial applications").

96. As per claim 27, Batten in view of Bellegarda teaches at least the summed accuracy scores for signal set, signal set and signal set groups of signals having a common variable value are weighted and summed to yield context accuracy scores (Batten Fig. 12A: element 47),

97. accuracy scores are weighted and summed to yield a combined accuracy score, the combined accuracy score and at least one other summed accuracy score are weighted and summed to yield a accuracy score (Batten Fig. 12A: element 42), and

98. at least the accuracy score and a summed accuracy score for a group corresponding to the variable are weighted and summed to yield an overall accuracy score (Batten Fig. 12A: element 43).

99. Batten does not teach the computer-readable medium of claim 26, wherein: the groups of signal sets comprise: groups of demographic signal sets, each demographic signal set in a group having an associated range of values for the source variable and the same value for the context variable, groups of scaling signal sets, each scaling

signal set in a group having an associated range of values for the scaling of a handwriting sample and the same value for the context variable, and groups of angle signal sets, each angle signal set in a group having an associated range of values for at least one angle of a component of a handwriting sample and the same value for the context variable.

100. Hoffberg teaches the computer-readable medium of claim 26, wherein: the groups of signal sets comprise: groups of demographic signal sets (Hoffberg: col 36, line 56: "Where large groups are present, demographic profiles may be employed, rather than individual preferences"), each demographic signal set in a group having an associated range of values for the source variable (Hoffberg: col 36, line 57: "demographic profiles may be employed, rather than individual preferences ... the source material has little variety, or is not the subject of strong preferences, the predictive power of the device as to a desired selection is limited") and the same value for the context variable (Hoffberg: col 82, line 14: "Thus, the interface, in obtaining necessary information, employs such available data source access methods as speech recognition, character recognition, digital telecommunication means, radio wave reception and interpretation, and links to other devices."; col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"), groups of scaling signal sets, each scaling signal set in a group having an associated range of values for the scaling of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to

information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 60: "group consisting of a ... predetermined scaling"), and groups of angle signal sets, each angle signal set in a group having an associated range of values for at least one angle of a component of a sample and the same value for the context variable (Hoffberg: col 32, line 45" "context refers to information relating to the environment of use, e.g., the variable inputs or data upon which the apparatus acts or responds"; col 47, line 59: "group consisting of a predetermined rotation"),

101. Hoffberg provides the motivation for using demographic signal sets on col 36 – line 50: "Thus, instead of a best match to a single preference profile for a single user, a group system provides a most acceptable match for the group. It is noted that this method is preferably used in groups of limited size". Hoffberg provides the motivation for context signal sets on col 28– line 17: "One factor limiting productivity of computer operators is the time necessary to communicate a desired action through an interface to a computerized device. The present technologies seek to reduce this limitation and make use of surplus processing capacity of the computer to predict a most likely input from the operator and present this as an easily available option". Hoffberg provides the motivation for using scaling and angle signals on col 2 – line 3: "certain displays are of small size, and thus the visibility of the information may also be optimized by taking into consideration the size, resolution, contrast, brightness of the display, ambient

conditions, characteristics of the human visual system, factors specific for a known user, and the available options of the apparatus"

102. Thiesson teaches context accuracy score (Thiesson: col 3, line 10: col 2, line 44: "Should a computing system fail to "comprehend" the name, it can utilize "context" such as what state a piece of mail is from and if the system recognize at least some of the characters in the city name"; "In this context, methods are employed to accurately interpret and exploit what a user inputs over a period of time"), word accuracy score (Thiesson: col 6, line 16: "The present invention includes systems and methods that enable adaptation of a general classification model to a specific user in order to improve classification"), and overall accuracy score (Thiesson: col 1, line 66: "At first, this technology had an accuracy of about 50 to 60%, but today it has progressed to an accuracy of near 98 to 99% or higher").

103. Thiesson provides the motivation for determining the accuracy of a system col 2 – line 5: "OCR technology reached an accuracy level where it seemed practical to attempt to utilize it to recognize handwriting".

104. Thiesson does not teach the signal processing engine to be evaluated comprises speech recognition; the signals to be processed comprise speech.

105. Li teaches the signal processing engine to be evaluated comprises speech recognition software (li: abstract: "The present invention recites a method and computer program product"), the signals to be processed comprise speech samples (li: col 2, line 51: " The classification method may be applied to any pattern recognition task, including, for example, OCR (optical character recognition), speech translation, and image analysis in medical, military, and industrial applications").

106. Claims 14 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5768478 (Batten) in view of USPN 6285785 (Bellegarda) as applied to claim 13 above, and further in view of USPN 5142666 (Yoshizawa).

107. As per claim 14, Batten in view of Bellegarda teaches the method of claim 13. Batten in view of Bellegarda does not teach wherein the transform function comprises: outputting the sum if the sum is above a threshold, and outputting number having a large absolute value if the sum is not above the threshold.

108. Yoshizawa teaches wherein the transform function comprises: outputting the sum if the sum is above a threshold, and outputting number having a large absolute value if the sum is not above the threshold (Yoshizawa: Fig. 1A: 4).

109. Yoshizawa provides the motivation for using the nonlinear thresholding function on col 1 - line 34: "applying a nonlinear threshold value process to the added values".

110. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Yoshizawa into Batten since Batten suggests a nonlinear function transforming function for the output of a neural network in general and Yoshizawa suggests the beneficial use of a thresholding nonlinear transforming function in the analogous art of neural networks.

111. As per claim 29, Batten in view of Bellegarda teaches the computer-readable medium of claim 28. Batten in view of Bellegarda does not teach wherein the transform function comprises:

outputting the sum if the sum is above a threshold, and outputting number having a large absolute value if the sum is not above the threshold.

112. Yoshizawa teaches wherein the transform function comprises:

outputting the sum if the sum is above a threshold, and outputting number having a large absolute value if the sum is not above the threshold (Yoshizawa: Fig. 1A: 4).

113. Claims 15 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5768478 (Batten) in view of USPN 6285785 (Bellegarda) as applied to claim 1 above, and further in view of USPGPubN 20050049983 (Butler).

Art Unit: 2624

114. As per claim 15, Batten in view of Bellegarda teaches the method of claim 1, further comprising:

setting accuracy scores for signal sets to equal 1 (Batten: Fig. 12A: element 26).

115. Batten does not teach applying confidence scores to weight factors; and calculating an overall confidence score.

116. Butler teaches applying confidence scores to weight factors (Butler: Fig. 5: 525); and calculating an overall confidence score (Butler: Fig. 5: 530).

117. Butler provides the motivation for calculating confidence scores on page 2 - paragraph 29: "A neural network acquires knowledge through iterative training that involves adjustments applied to its weights and thresholds. More specifically, the training process comprises an adaptation of the interconnection and values of weights to achieve a desired mapping of known inputs to known outputs. Various techniques may be used for training neural networks to determine the optimal set of weights for the neural network for a given classification problem. Once an acceptable set of weights is derived, the neural network can then be used as an algorithm for classifying unknown input data".

118. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Butler into Batten since Batten suggests a neural network with variable weights in general and Butler suggests the

beneficial use of confidence scores to assess the selection of weights in the analogous art of neural networks.

119. As per claim 30, Batten in view of Bellegarda teaches the computer-readable medium of claim 16, further comprising:

setting accuracy scores for signal sets to equal 1 (Batten: Fig. 12A: element 26).

120. Batten does not teach applying confidence scores to weight factors; and calculating an overall confidence score.

121. Butler teaches applying confidence scores to weight factors (Butler: Fig. 5: 525); and calculating an overall confidence score (Butler: Fig. 5: 530).

Conclusion

122. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPGPubN 20030068610 discloses that in training the setting of the weight values is relative to the frequency of the features in paragraph 78. USPN 5091780 discloses that the frequent co-occurrence of two situations in training images results in the back-propagation algorithm assigning large positive weights in the training process (Fig. 5; col 10, line 53 – col 11, line 11).

123. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

124. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

125. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Atiba Fitzpatrick whose telephone number is (571) 270-5255. The examiner can normally be reached on M-F 10:00am-6pm.

126. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571)272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

127. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

Art Unit: 2624

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Atiba Fitzpatrick

Patent Examiner

/Samir A. Ahmed/
Supervisory Patent Examiner, Art Unit 2624